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AN - 2002-451831 [48]

TI - Substrate for non-contact IC card, uses mica capacitors for smoothing and synchronization, respectively

AB - JP2002140672 NOVELTY - The substrate (4) for non-contact IC cards, is mounted with mica capacitors (2,3) for smoothing and synchronization.

- DETAILED DESCRIPTION - An INDEPENDENT CLAIM is included for non-contact IC card.
- USE - For non-contact IC card (claimed).
- ADVANTAGE - Thickness is thinner than the IC chip and it is excellent to a hydroscopic property proof. Adjustment of a capacitor capacitance is easy. The non-contact IC card excellent in surface smoothness property can be obtained.

- DESCRIPTION OF DRAWING(S) - The figure shows the substrate for non-contact IC cards mounting IC chip directly and the sectional drawing of the mica-capacitor portion.
- Mica capacitors 2,3
- Substrate 4
- (Dwg.2/5)

IW - SUBSTRATE NON CONTACT IC CARD MICA CAPACITOR SMOOTH SYNCHRONISATION RESPECTIVE

PN - JP2002140672 A 20020517 DW200248 G06K19/07 007pp

IC - B42D15/10 ;G06K19/07 ;G06K19/077

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3.In the drawings, any words are not translated.

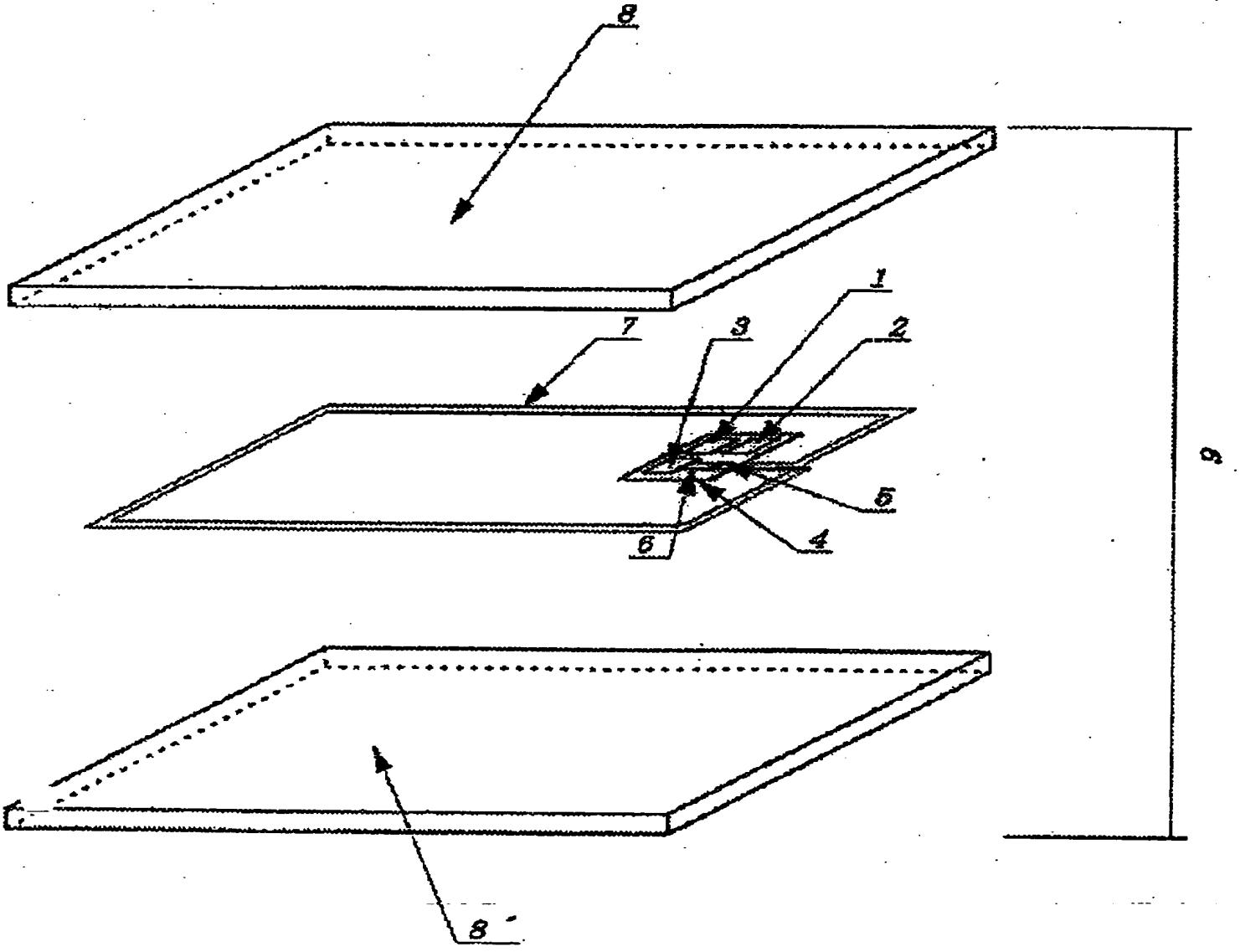
DETAILED DESCRIPTION

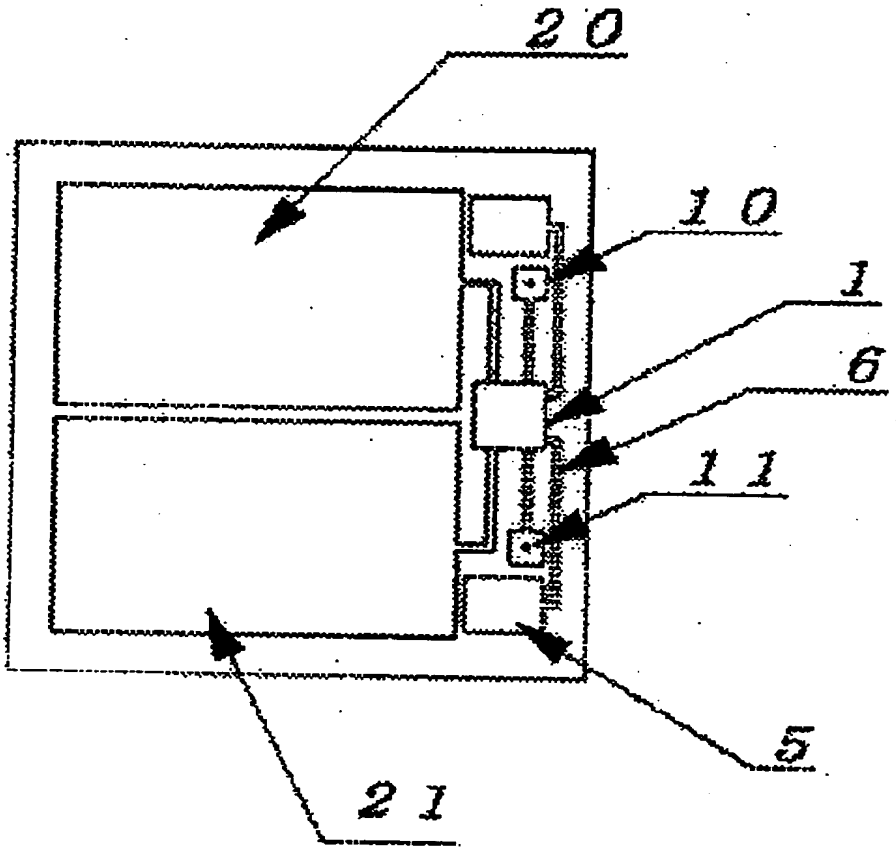
[Detailed Description of the Invention]
[0001]
[The technical field to which invention belongs] this invention relates to the substrate for noncontact IC cards contained especially in a noncontact IC card base material among external devices, such as a terminal unit, about the noncontact IC card which transmits and receives data in non-contact.
[0002]
[Description of the Prior Art] Conventionally, the IC card using IC chip has spread for the purpose which memorizes and processes a lot of [important and] data, such as a money card and an ID card. In recent years, not only the IC card of the contact process which connects and uses the external terminal and external terminal of an IC card but an antenna is built in, use of the IC card of the non-contact formula which performs the data exchange between external instruments by non-contact by the electric wave or the electrostatic coupling increases, and need is increasing from the reasons of mitigation of a maintenance of the needlessness of receipts and payments of a card, and an external terminal etc.
[0003] Drawing 3 is the fundamental circuitry view of a noncontact IC card. IC chip (1), the diode for rectification (17), and the capacitor for smooth (15) are connected to the antenna coil (7) and the capacitor for alignment (16) which form a resonance circuit. By the electromagnetic wave from the reader writer which is not illustrated, the magnetic field near the antenna coil (7) was changed, induced voltage was generated in the antenna coil (7), and it uses as a power supply.
[0004] Drawing 4 is the perspective diagram showing the structure of the conventional noncontact IC card. IC chip with which it has non-contact communication facility, and the diode for rectification was formed (1), The capacitor for voltage smooth (18) and the capacitor for alignment (19) are carried on the substrate for noncontact IC cards (4). The antenna coil (7) formed by printing etching, a silver paste, etc. of coils, such as copper wire, or a metallic foil is connected, and it is manufactured by containing in a card base material (8 8'). The chip capacitor which consists of a ceramic is used as the capacitor for smooth (18), and a capacitor for alignment (19).
[0005] The chip capacitor which consists of the above-mentioned ceramic was thicker than IC chip (1) which is usually the thickness of 150-250 micrometers, and when it contained and card-ized in a card base material (8 8'), the portion of a chip capacitor protruded and it had a problem of a card face becoming less smooth. Furthermore, after connecting an antenna coil (7) to the substrate for noncontact IC cards (4), in order to obtain the resonance frequency of hope and to have adjusted the capacitor for alignment (19), the capacitor for alignment (19) had to be changed by soldering etc. Then, as the thickness of a capacitor is shown in drawing 5 in order to make it thin, the capacitor for voltage smooth (20), the capacitor for alignment (21), and a circuit pattern (6) are formed by **********ing metallic foils (23) formed in both sides of film base materials (22), such as PET and a polyimide, such as copper foil and aluminum foil, and the method of mounting IC chip (1) directly on the substrate for noncontact IC cards (4) is used. It becomes possible the process of capacitor loading to up to a substrate not only to decrease, but to cut off the metallic foil (23) of the capacitor for alignment (21) for an antenna coil (7) with laser etc. after connection, and to adjust capacitor capacity.
[0006] However, if the dielectric constant of a film base material (22) is taken into consideration, in order to form the capacitor of a big capacity, when a big area was needed compared with the chip

capacitor and the film base material (22) absorbed moisture, there was a problem that electrostatic capacity will change.
[0007]
[Problem(s) to be Solved by the Invention] It was made in order that this invention might solve the above problems, and thickness is thinner than IC chip and it excels in hygroscopicity-proof, and adjustment of capacity is easy and it aims at offering the substrate for noncontact IC cards in which the capacitor which can be formed in small area was carried.
[0008]
[Means for Solving the Problem] In order to attain the above-mentioned technical problem in this invention, in the substrate for noncontact IC cards first contained in a noncontact IC card base material in a claim 1, the substrate for noncontact IC cards characterized by using a mica capacitor for the capacitor carried on a substrate is offered. In a claim 2, the noncontact IC card which contained the substrate for noncontact IC cards according to claim 1 is offered.
[0009]
[Embodiments of the Invention] Hereafter, it explains per form of operation of this invention. Drawing 1 is a perspective diagram of a noncontact IC card which contains the substrate for noncontact IC cards of this invention. The capacitor for IC chip (1) voltage smooth (2) and the capacitor for alignment (3) are carried on the substrate for noncontact IC cards (4), an antenna coil (7) is connected, and it is manufactured by containing in a card base material (8 8').
[0010] IC chip (1) has non-contact communication facility, and the diode for rectification is usually formed in IC chip (1). The connection with the substrate for noncontact IC cards (4) of IC chip (1) is connected by the anisotropy electric conduction film (it is indicated as ACF:Anisotropic Conductive Film below) which is not illustrated. ACF is the charge of a binder which distributed electric conduction particles, such as nickel and plastics by which the metal coat was carried out, in adhesives, such as an epoxy system resin, and when adhesives melt by heating and an electric conduction particle is held by pressurization on the circuit pattern of a substrate with the bump of IC chip in the process to harden, since a particle exists independently, insulation is acquired in lengthwise conductivity and a longitudinal direction. It may connect using the under-filling agent which does not contain the shape not of a film but a liquefied anisotropy electric conduction paste (following ACP:Anisotropic Conductive Paste), and an electric conduction particle.
[0011] Since the mica capacitor which consists of a mica with a thickness of 15-30 micrometers is used as the capacitor for smooth (2), and a capacitor for alignment (3), it is thin, the electrostatic capacity of hope can be obtained in small area, it excels in hygroscopicity-proof, and laser etc. can adjust capacitor capacity after antenna connection.
[0012] By **********ing the metallic foil on glass epoxy with a thickness of about 100 micrometers, the substrate for noncontact IC cards (4) forms a circuit pattern (6), and is manufactured. That in which etching processing of what stuck and united the metallic foil with films, such as a polyimide and PET, even if it was not the substrate which consists of glass epoxy was carried out, and the circuit pattern was formed can also be used. Moreover, if an electrode (13) is formed in both sides of a mica (12) with a silver paste etc. as shown in drawing 2 , the capacitor for voltage smooth (2) and the capacitor for alignment (3) are formed and IC chip (1) is mounted directly, the process which carries the capacitor for voltage smooth (2) and the capacitor for alignment (3) will become unnecessary.
[0013] An antenna coil (7) can use the antenna coil formed by etching-processing or printing copper, aluminum, a silver paste, etc. on films, such as a coil antenna which consists of about phi= 100-micrometer copper wire, and a polyimide, PET.
[0014] The substrate by which the antenna coil (7) was connected to the end-connection child (5) is card-ized by the card-ized base material (8 8'). Resins, such as vinyl chloride, and ABS, PET, can be used as a card-ized base material (8 8'). as the method of card-izing Besides the method which carries out a heat lamination by the thermoplastic card-ized base material (8 8') the substrate after antenna-coil connection -- metal mold -- there is an adhesives restoration lamination method which inserts inside, injects a card-ized resin, applies adhesives to the substrate after the injection-molding method which performs card-ization, and antenna connection, sticks and unites a card base material, and performs card-ization

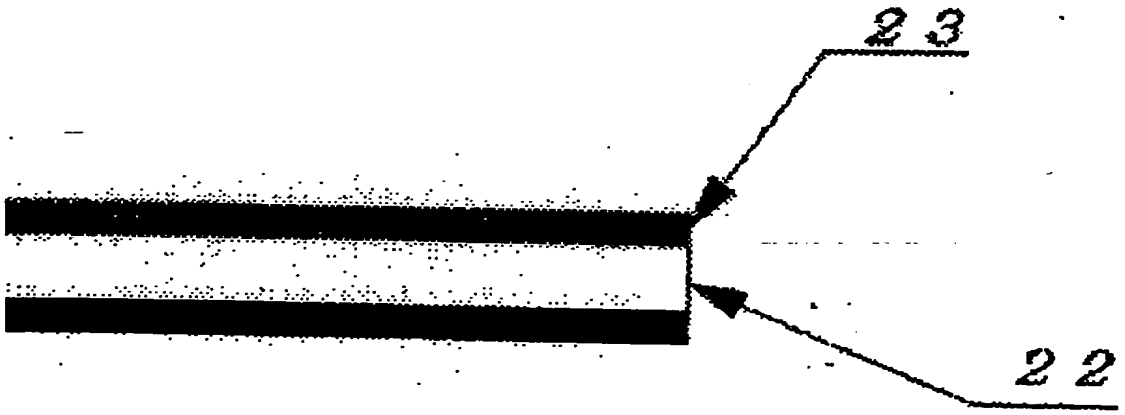
[0015]
[Example 1] Hereafter, an example explains this invention in detail. As shown in drawing 2 , the substrate for noncontact IC cards (4) which formed the capacitor for voltage smooth (2), the capacitor for alignment (3), and the circuit pattern (6) with a silver paste on the mica (12) with a thickness of 20 micrometers was manufactured, and IC chip (1) with a 4.5mm[4mm by] x thickness of 150 micrometers was carried on the substrate for noncontact IC cards (4) by ACF with a thickness [containing a nickel particle] of 30 Since the capacitor for voltage smooth (2), the capacitor for alignment (3), and the circuit pattern (6) were formed on the mica (12), formation of the substrate for noncontact IC cards in few area was more possible for the need for capacitor loading than the film capacitor which there is not and was being used conventionally [of drawing 5].
[0016] Next, it was 12.37MHz, when the antenna coil (7) which consists of phi= 110-micrometer copper wire was connected to the substrate for noncontact IC cards (4) in which IC chip (1) was carried and resonance frequency was measured. For 13.56MHz, the resonance frequency after target antenna-coil (7) connection made small area of the silver paste which forms the electrode of the capacitor for alignment (3) using laser, and it adjusted it so that resonance frequency might be set to 13.56MHz. When resonance frequency was measured, it was able to be set to 13.56MHz and target resonance frequency was able to be obtained. Therefore, it has proved that the substrate for noncontact IC cards (4) in which the mica capacitor of this invention was carried could perform capacity adjustment easily.
[0017] Next, 200 substrates which connected the antenna coil (7) and performed capacity adjustment to 13.56MHz by the capacitor for alignment (3) were prepared, and it put into the high-humidity/temperature tub of the temperature of 55 degrees C, and 90% of humidity. When it took out from the tub 24 hours after and resonance frequency was measured immediately, there was no change in 13.56MHz and frequency with all samples. Therefore, it has proved that a mica (12) absorbed moisture, capacity did not change and the substrate for noncontact IC cards of this invention (4) was excellent in hygroscopicity-proof.
[0018] Next, the substrate [finishing / antenna-coil (7) connection] for noncontact IC cards (4) was card-ized by the card-ized base material (8 8'). The heat lamination method was used as the method of card-izing, using two sheets of the vinyl chloride of 380-micrometer ** as a card-ized base material (8 8'). The card-ized card was able to obtain the card excellent in surface smooth nature, without a capacitor protruding, since the substrate which mounted the direct IC chip on the mica is contained.
[0019] Therefore, the substrate for noncontact IC cards (4) made as an experiment by this invention excelled [capacitor] in hygroscopicity-proof, adjustment of capacitor capacity was easy for it, and in small area, it was able to obtain the noncontact IC card which was excellent at surface smooth nature while capacitor formation was possible.
[0020]
[Effect of the Invention] Since this inventions are the following composition, they have the **** effect taken below. In the substrate for noncontact IC cards first contained in a noncontact IC card base material in a claim 1, since it is the substrate for noncontact IC cards characterized by using a mica capacitor for the capacitor carried on a substrate, a capacitor is excellent in hygroscopicity-proof, and adjustment of capacitor capacity is easy and can obtain the substrate for noncontact IC cards in which capacitor formation is possible in small area.
[0021] In a claim 2, since the substrate for noncontact IC cards according to claim 1 is contained, the noncontact IC card excellent in surface smooth nature can be obtained.

[Translation done.]

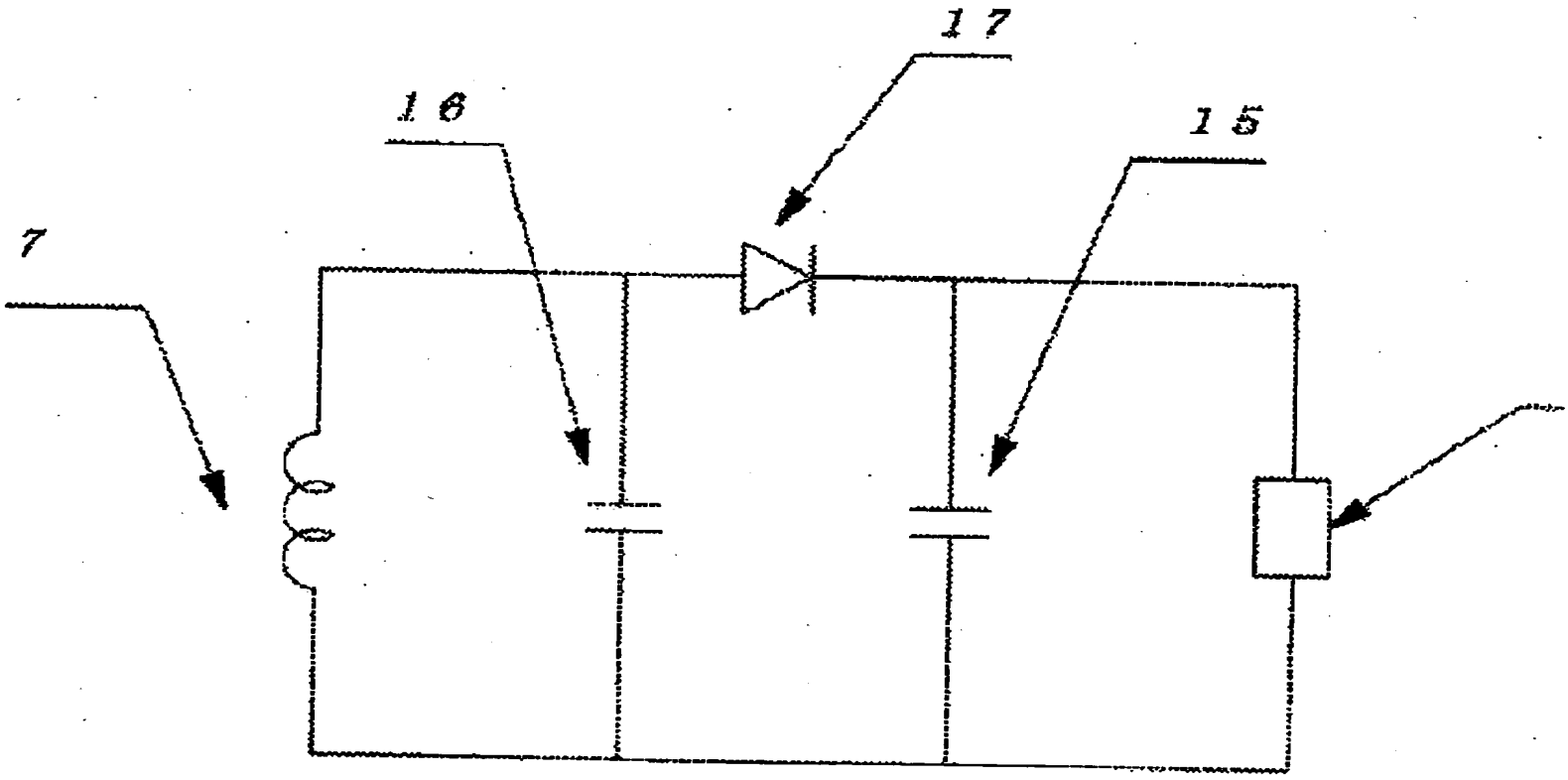

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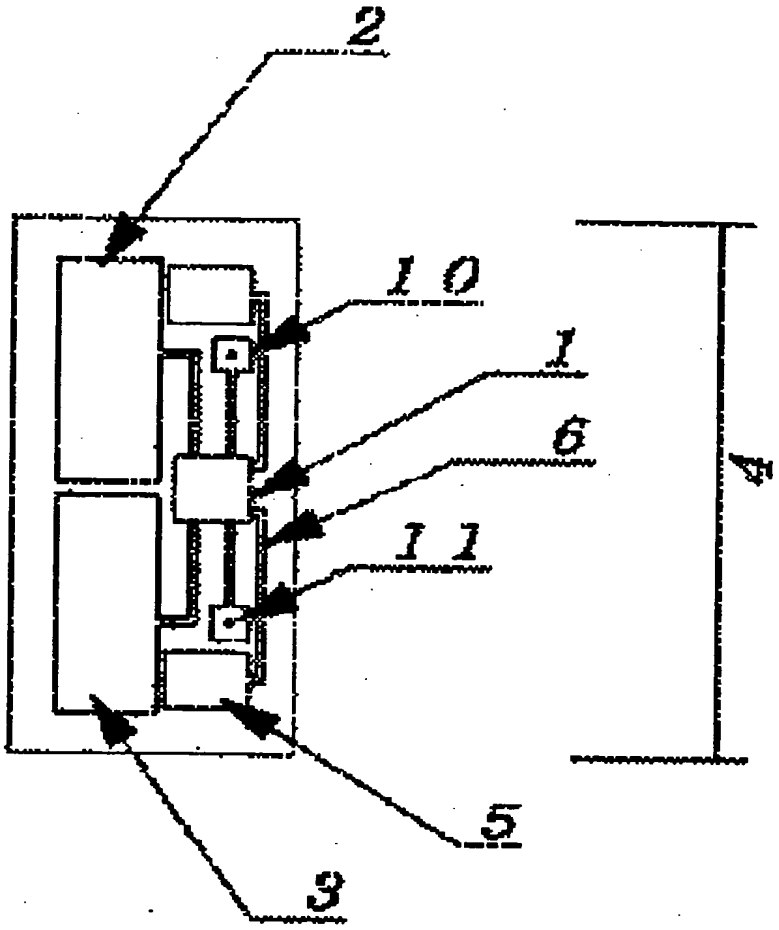


(a)



(b)


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(a)

